

What is claimed is:

1           1.   A magnetic field sensor characterized by  
2 comprising:

3           a magnetic field element which outputs a signal in  
4 accordance with an applied magnetic field strength in first  
5 and second phases of a signal given from the outside of  
6 said magnetic field element, wherein polarities of the  
7 signal from said magnetic field element in said first phase  
8 and said second phase are mutually opposite;

9           an amplifier which amplifies the signal from this  
10 magnetic field element and outputs a voltage signal across  
11 a pair of output terminals;

12           a condenser of which both ends are connected to the  
13 pair of output terminals of said amplifier;

14           a switch which is inserted and makes a connection  
15 between one of said output terminals in the pair and one  
16 terminal of said condenser, and which is closed in said  
17 first phase of the signal and is opened in said second  
18 phase of the signal; and

19           a comparator which inputs voltage across both ends of  
20 said switch and converts a result of the comparison of the  
21 voltage across both ends of said switch with a  
22 predetermined voltage into a binary signal so as to output.

1           2.    A magnetic field sensor according to Claim 1,  
2    characterized by further comprising:

3           a latch circuit which inputs said binary signal and  
4    outputs an either value of said binary signal, which is  
5    latched at the timing synchronized with a phase within said  
6    second phase of the signal.

1           3.    A magnetic field sensor according to Claim 1,  
2    characterized in that said predetermined voltage of said  
3    comparator varies depending on the output signal of said  
4    latch circuit.

1           4.    A magnetic field sensor according to Claim 1,  
2    characterized in that said magnetic field element is a Hall  
3    element.

1           5.    A magnetic field sensor according to Claim 1  
2    characterized by further comprising a switch circuit for  
3    inputting a signal from said magnetic field element and  
4    outputting the signal to said amplifier, wherein

5           said switch circuit comprises first and second and  
6    memory elements; and

7           in said first phase of the signal, the output voltage  
8    from said magnetic field element is stored in said first  
9    memory element and the voltage stored in said second memory

10 element is given to said amplifier and,  
11 in said second phase of the signal, the voltage stored  
12 in said first memory element is given to said amplifier and  
13 the voltage from said magnetic field element is stored in  
14 said second memory element.

1 6. A magnetic field sensor according to Claim 5,  
2 characterized in that at least one memory element among  
3 said memory elements is a capacitor.

1 7. A magnetic field sensor according to Claim 1  
2 characterized in that:

3 said magnetic field element outputs the signal from a  
4 first terminal pair in said first phase of the signal and  
5 the signal from a second terminal pair in said second phase  
6 of the signal in accordance with the applied magnetic field  
7 strength; and a magnetic field sensor further comprises a  
8 switch circuit for inputting the signal from said magnetic  
9 field element and outputting the signal to said amplifier,  
10 wherein

11 said switch circuit comprises:

12 first and second condensers;

13 a first connection part which connects terminals of  
14 said first terminal pair and both ends of said first  
15 condenser, respectively;

16           a second connection part which connects terminals of  
17       said second terminal pair and both ends of said second  
18       condenser, respectively;

19           a first switch part which is inserted and makes a  
20       connection in said first connection part and which closes  
21       this first connection part in said first phase and opens  
22       this first connection part in said second phase;

23           a second switch part which is inserted and makes a  
24       connection in said second connection part and which opens  
25       this second connection part in said first phase and closes  
26       this second connection part in said second phase;

27           a third connection part which connects both ends of  
28       said first condenser to the input terminal of said  
29       amplifier as well as to one output terminal of said  
30       amplifier, respectively;

31           a fourth connection part which connects both ends of  
32       said second condenser to the input terminal of said  
33       amplifier as well as to said output terminal of said  
34       amplifier, respectively;

35           a third switch part which is inserted and makes a  
36       connection in said third connection part and which opens  
37       this third connection part in said first phase and closes  
38       this third connection part in said second phase; and

39           a fourth switch part which is inserted and makes a  
40       connection in said fourth connection part and which closes

41 this fourth connection part in said first phase and opens  
42 this fourth connection part in said second phase.

1 8. A method for detecting magnetic field comprising  
2 the steps of:

3 (a) outputting a signal according to an applied  
4 magnetic field strength through a magnetic field element in  
5 a first signal period;

6 (b) outputting the signal according to the applied  
7 magnetic field strength through said magnetic field element  
8 in a second signal period, wherein polarities of the  
9 signals according to the applied magnetic field strength in  
10 said first signal period and said second signal period are  
11 mutually opposite;

12 (c) amplifying the signal from said magnetic field  
13 element in said first signal period for outputting a  
14 voltage signal across a pair of output terminals of an  
15 amplifier and inputting a signal of the pair of output  
16 terminals of said amplifier to both ends of a condenser;

17 (d) amplifying the signal from said magnetic field  
18 element in said second signal period for outputting a  
19 voltage signal across a pair of output terminals of said  
20 amplifier and inputting a signal of one output terminal in  
21 the pair to one end of said condenser, and outputting a  
22 signal across the other end of said condenser and the other

23 output terminal of said amplifier;

24 (e) comparing the signal across the other end of said  
25 condenser and the other output terminal of said amplifier  
26 with a predetermined voltage; and

27 (f) converting the results of the comparison of the  
28 signal into a binary signal so as to output.

1 9. A method for detecting magnetic field according  
2 to Claim 8, characterized by further comprising a step of:

3 (g) latching said binary signal at the timing  
4 synchronized with a phase within said second signal period  
5 and outputting an either value of said binary signal.

1 10. A method for detecting magnetic field according  
2 to Claim 8, characterized by further comprising a step of:

3 (h) varying said predetermined voltage in accordance  
4 with the output signal of said latching step.

1 11. A method for detecting magnetic field according  
2 to Claim 8, characterized in that said magnetic field  
3 element outputs a signal in accordance with a Hall effect.

1 12. A method for detecting magnetic field according  
2 to Claim 8, characterized by further comprising a step of:

3 (i) halting a power source supply to the magnetic

4 field element in every constant period.